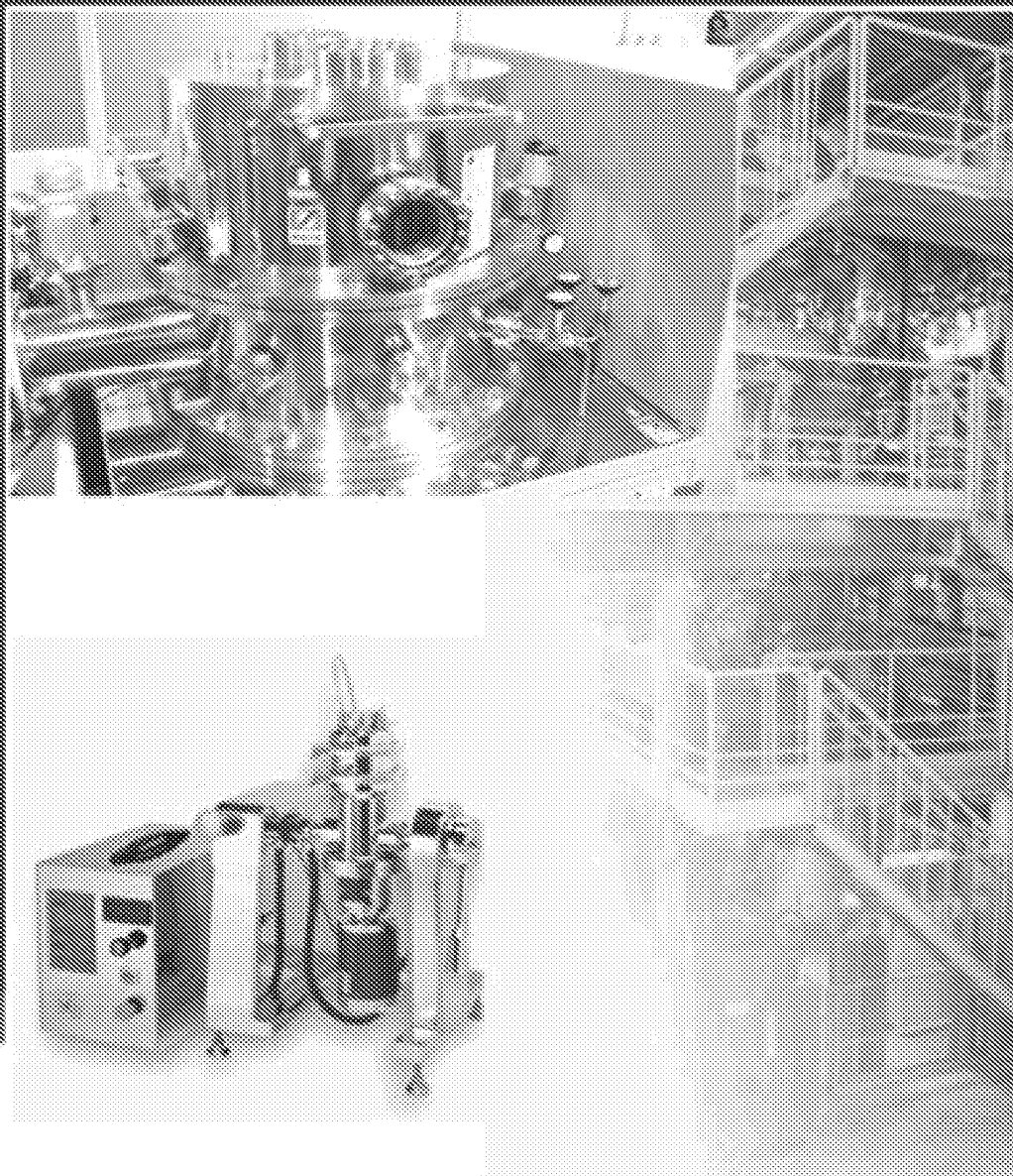
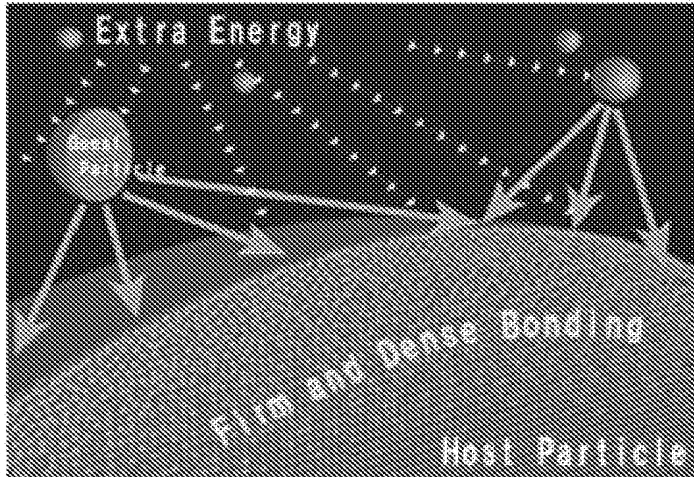


ADVANCED TECHNOLOGY FOR FINE PARTICLES



HOSOKAWA MICRON CORPORATION

HOSOKAWA's Advanced Technology for Fine Particle Composite Mechano Chemical Bonding (MCB) Technology



HOSOKAWA's MCB Technology enables mechanochemical bonding of different types of particles on the molecular level to produce fine particle composites, utilizing mechanical energy to help create nano-bonding structures at the bonding interface. This process is applicable to any combination of any particles.

Using the MCB Technology, it is easy to design and produce highly functional composites.

Compared to similar wet processes, the MCB Technology process is more simplistic and covers a wider range of particles and combinations.

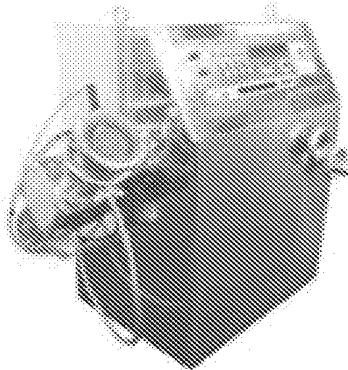
Using the MCB Technology, control is not limited to the production of particle composites via the surface bonding process but the formation of particle shape can be accomplished.

HOSOKAWA Machines for Fine Particle Composite Production

Machines to create functional particles for high value-added materials through the bonding process of very fine particles on the nano-level.

Nano-particle composite production system

NANOCULAR™ P-Laboratory model for laboratory scale



NANOCULAR P-Laboratory model is used for Laboratory for R&D development of advanced materials. In conjunction with mechanical energy the machine utilizes plasma irradiation to clean the particle surface, enabling the creation of NEW functionality materials.

[Technical Specification]

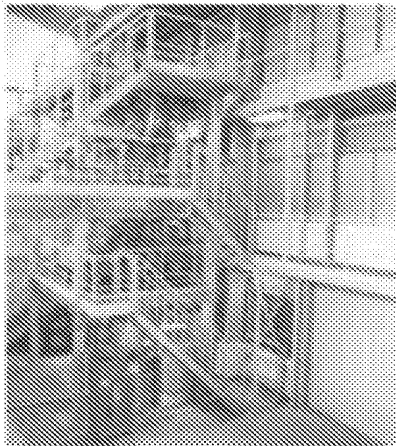
Model: NC-Lab-P

Motor: 2.2 kW

Effective Capacity: 0.1 liter

Nano-particle composite production system

NANOCULAR™ P-Continuous model for continuous commercial production



NANOCULAR P-Continuous system is used for continuous commercial production of advanced materials. In conjunction with mechanical energy the machine utilizes plasma irradiation to clean the particle surface, enabling the creation of NEW functionality materials.

[Technical Specification]

System Composition: NC-400-P, Vacuum pump,

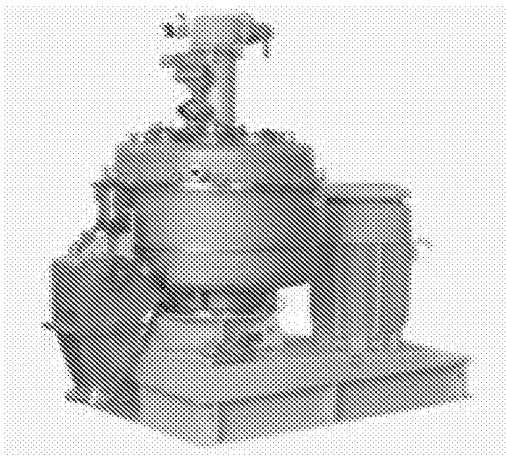
Chiller unit and Pre-mixer

Installed Capacity: Approximately 100 kW

(NANOCULAR is named after "nano" from nano-particle and "cular" from molecular.)

Particle composite production system

Mechanofusion®



Mechanofusion precisely mixes different types of particles by applying mechanically generated load to the material during processing. In addition, it produces particle composites and controls the formation of particle shape. The Mechanofusion series of machines, range from small laboratory units to large capacity systems. The reputation of the Mechanofusion system has been successful in numerous industrial fields. In addition, the series include systems for medical GMP applications with a capacity range of 0.1-liter to 1.0-liter.

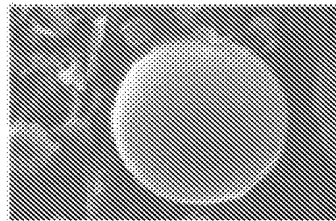
[Technical Specification]

Models: AMS-Lab through to AMS-100F

Motor: 2.2 up to 150 kW

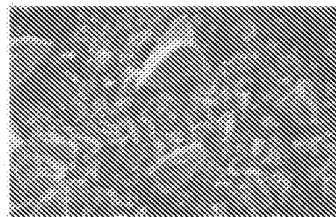
Capability: 1.2 up to 200 liters

Application for electronic and electric component (metal / ceramic)



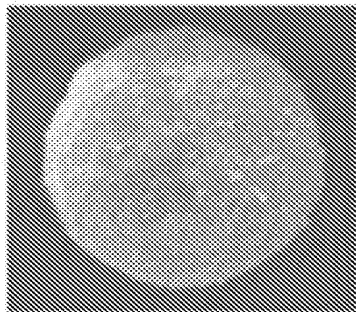
Fine metal particle

10µm



Super fine ceramic particles

10µm



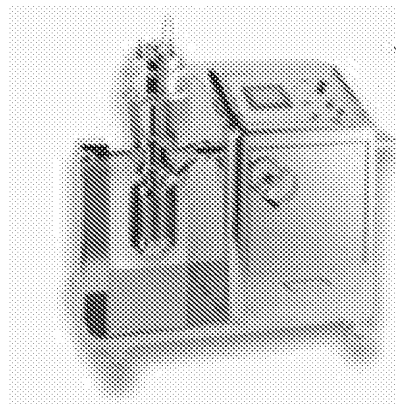
Particle composite

10µm

The image shows a particle composite formed by bonding super fine ceramic particles on the surface of a fine metal particle. When the composite is compressed and sintered, it is transforming into a new material that is electrically insulated but still magnetically appealing.

Particle composite production system

Mechanofusion® for Pharmaceutical GMP Application



◀ AMS-Lab-GMP

For production of large quantity of samples

Motor: 2.2 kW

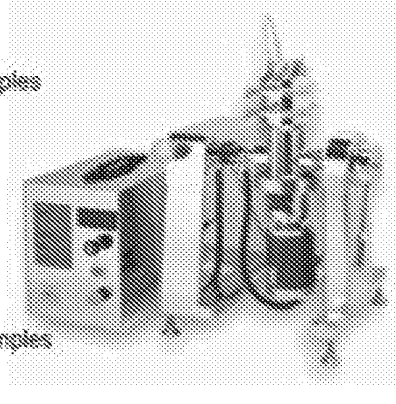
Effective Capacity: 1 liter /Batch

AMS-Mini-GMP ▶

For production of small amount of samples

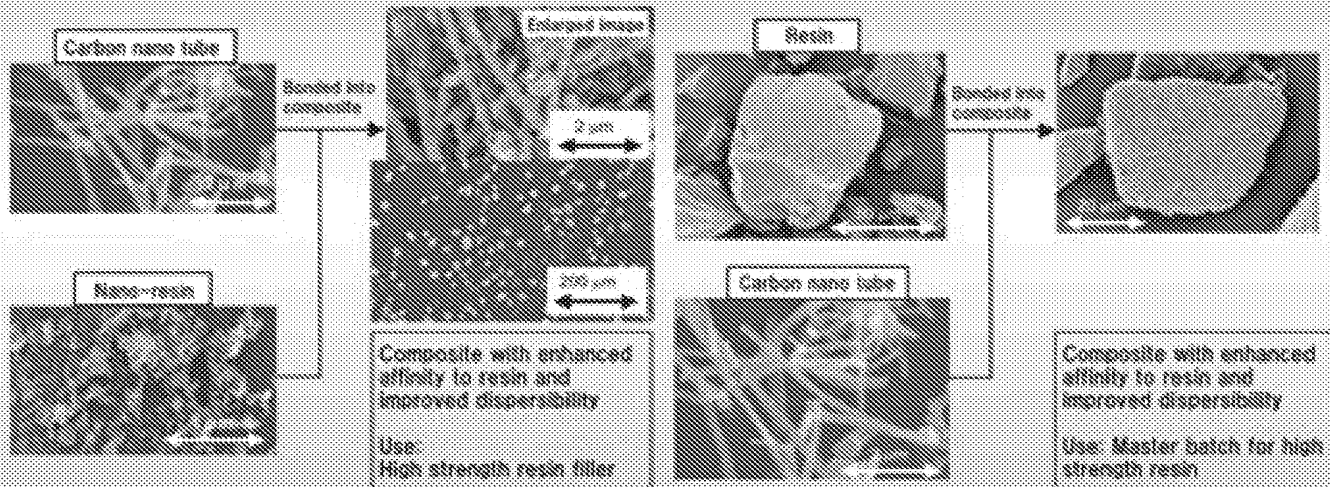
Motor: 0.75 kW

Effective Capacity: 100 mL /Batch

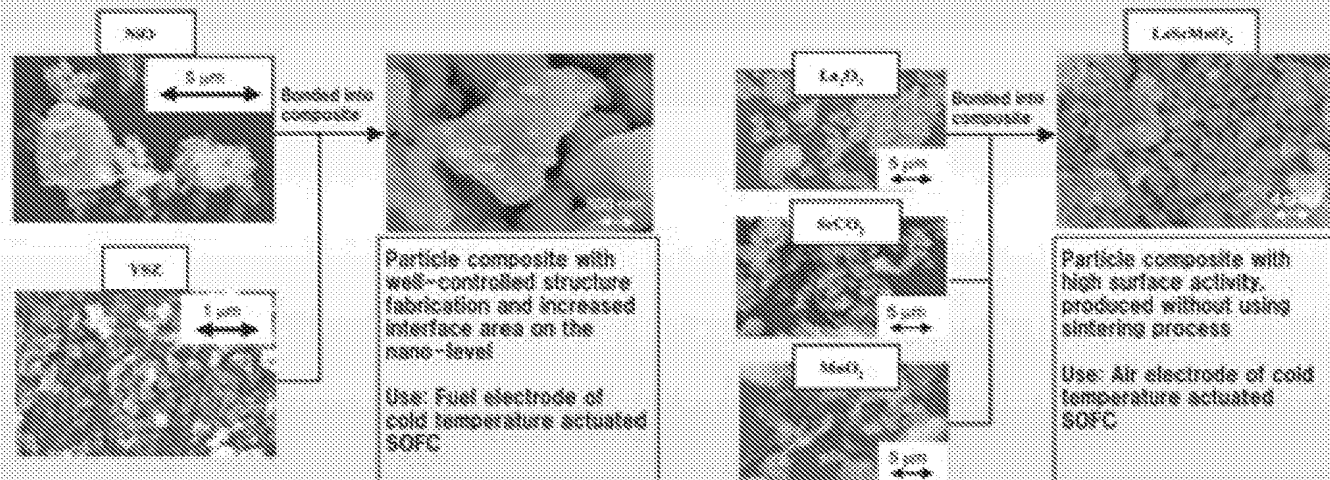


Examples of Fine Particle Composite Production

Nano Composite Production Practice: Application for Carbon Nano Tube



Nano Composite Production Practice: Application for Electrode of SOFC (solid-oxide fuel cell)



Process Technologies for Tomorrow



HOSOKAWA MICRON CORPORATION



POWDER PROCESSING SYSTEM COMPANY

(HEAD OFFICE) No.9, 1-chome, Shoudai Tajika, Hirakata-shi, Osaka 573-1132 Japan
TEL +81-72-855-2224 FAX +81-72-855-2679
e-mail: inter@hmc.hosokawa.com

NANO MATERIAL DIVISION

No.9, 1-chome, Shoudai Tajika, Hirakata-shi, Osaka 573-1132 Japan

HOSOKAWA MICRON LTD.

Rivington Road, Whitehouse, Runcorn, Cheshire, England. WA7 3DS.
TEL: +44 (0) 1928 755100 FAX: +44 (0) 1928 714325
e-mail: powder@hmluk.hosokawa.com

URL <http://www.hosokawa.co.uk>

URL <http://www.hosokawamicon.co.jp>
2004 HMC All Rights Reserved